

REMARKS

In the Office Action dated March 30, 2007, the drawings were objected to under 35 U.S.C. §1.83(a) because the Examiner stated all of the steps of claims 1-9 must be shown.

In response, new Figures 9 and 10 are submitted herewith, which are flow charts for the steps of claims 1-9. Since claims 1-9 are part of the original disclosure, and since the subject matter of Figures 9 and 10 is also thoroughly described in the present specification, the addition of Figures 9 and 10 does not represent new matter. The written portion of the specification has been editorially amended to refer to these new Figures.

Claims 5, 15 and 23 were objected to because of informalities therein, all of which have been corrected.

Claims 2-4, 11-16, 22 and 23 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite because of a lack of antecedent basis for certain terms in those claims. Those claims also have been editorially revised to conform the claims to the requirements of Section 112, second paragraph.

Claims 1, 10 and 14-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wang et al in view of an article by Eldeib et al. Claims 3, 4, 12 and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wang in view of an article of Eldeib et al. Claims 3, 4, 12 and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wang et al and Eldeib et al, further in view of an article by Rosenfeld et al. These rejections are respectfully traversed for the following reasons.

Independent claims 1 and 10 claim a method and a medical apparatus, respectively, wherein marks are disposed on a surface of a subject and a volume data set of the subject is obtained, with the volume data set containing data representing images of the marks and data representing an image of at least a part of the subject containing the surface on which the marks are disposed. Each of independent claims 1 and 10 then describes how the image of the surface is segmented and the volume data set is transformed so that the segmented image of the surface is transformed into a plane, so as to allow coordinates of the images of the marks in the data set to be determined as well as coordinates of the images of the marks in the volume data set.

Applicants acknowledge, as stated by the Examiner at page 5 of the Office Action, that the Wang et al reference discloses a method for determining coordinates of images and marks in a volume data set, wherein marks are disposed on the surface of a subject, and a volume data set is obtained that contains images of the marks and an image of at least a part of the subject containing the surface on which the marks are disposed. As explained in the paragraph bridging pages 2 and 3 of the present specification, wherein Applicants discussed the Wang et al reference, a disadvantage of the method disclosed therein is that the entire volume data set must be examined in order to search for the marks, in order for the remainder of the method to proceed. This procedure is calculation-intensive and requires the application of filter operators to the entire volume data set, which increases the probability of images of the marks being falsely recognized.

One feature of the solution of the present Applicants to overcome this problem that is inherent in the Wang et al method is to undertake the aforementioned

segmenting of the image of the surface. The Examiner has acknowledge that the Wang et al reference does not disclose such segmenting of the image of the surface, and has relied on the Eldeib et al reference as providing such a teaching, as well as the other features noted above that are present in independent claims 1 and 10. The Examiner stated Eldeib et al disclose an advantage of the procedure disclosed in Eldeib et al article as being that one can "...now use matching image processing tools in the matching, hence reducing the time taken..". Apparently simply because of this statement in the Eldeib et al reference, the Examiner concluded that "therefore" it would have been obvious to combine Eldeib et al with Wang et al to achieve the aforementioned advantage. Applicants respectfully disagree with this conclusion.

In general, it is Applicants position that despite the use of segmenting in the Eldeib et al procedure, the overall procedure is so different from the Wang et al procedure, and therefore different from the features of claims 1 and 10 of the present application, such that if a person of ordinary skill in the field of imaging processing had the insight to modify the Wang et al procedure in accordance with the teachings of Eldeib et al, this would be an insight supporting patentability, rather than a reason for precluding patentability.

This is because the Eldeib et al article discloses a method for registration of *two* 3D scans of an object by an automatic segmentation technique applied to the surface of the object, and then *matching* the 2D data sets of the images of the two *surfaces* that are obtained by the segmentation. This is described in Section 2, paragraph 5, lines 1-2 of the Eldeib et al article.

In the surface segmentation, Eldeib et al make use of *points* on the surface in question, which are then connected by lines in order to achieve the aforementioned segmentation. These points, however, are not markers that are applied to the surface of a subject, which are then imaged in the volume data set that is obtained from the surface, but are instead computer-generated points that exist only a computer display screen. They are not included in the volume data set that is being analyzed in the Eldeib et al reference, but are *added thereto* after the volume data set has been completely obtained.

In fact, the Eldeib et al reference discloses a method for surface registration without placing marks on the subject, which is specifically referred to as the so-called SPS representation. As noted above, this SPS registration proceeds completely electronically within the computer that is being used to process the image data, and has nothing whatsoever to do with any marks that are on the surface of the subject and that are imaged within the volume data set itself.

Moreover, as noted above, the purpose of undertaking the segmentation in the Eldeib et al reference is not to determine coordinates of the images of the marks in the image data set, nor to determine coordinates of the images of the marks in the volume data set but is instead for the purpose of *matching* images of two surfaces.

In fact, modifying the procedure disclosed in the Wang et al reference in accordance with the teachings of Eldeib et al would be useless, because placing the marks on the surface of the subject, as disclosed in the Wang et al reference and as occurs in the subject matter of claims 1 and 10 of the present application, is completely unnecessary in the context of the Eldeib et al reference, wherein the points are simply generated at a computer screen. The marks disposed on the

surface of the subject, and the images thereof in the volume data set, would go completely unused in the Eldeib et al procedure, since the Eldeib et al procedure simply makes use of the image of the surface, and then *adds* computer-generated points thereto.

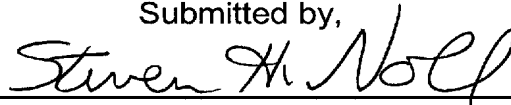
Claims 1 and 10 and the claims depending therefrom, therefore, would not have been obvious to a person of ordinary skill in the field of image processing under the provisions of 35 U.S.C. §103(a), based on the teachings of Wang et al and Eldeib et al.

The same arguments are applicable to the rejection of claims 3, 4, 12 and 13 under 35 U.S.C. §103(a). Even if the Examiner's statements regarding the teachings of Rosenfeld et al are correct, modifying the Wang et al and Eldeib et al combination further in view of those teachings of Rosenfeld et al still would not result in the subject of any claims 3, 4, 12 or 13, which embody the subject matter of the aforementioned independent claims therein.

Applicants note with appreciation the subject matter the subject matter that was indicated by the Examiner to be allowable, but the Examiner's statements on that point are somewhat confusing, since claim 24 was included in all three of the categories of allowable subject matter. The Examiner stated that claims 17-24 are allowed, but then included claim 24 as being among the claims that "will be allowable" once the objections and the rejection under Section 112 are corrected. The Examiner also included claim 24 as being among the claims that were objected to as depending from an objected to or rejected base claim.

In any event, Applicants submit that all claims of the application are in condition for allowance, and early reconsideration of the application is respectfully requested.

Submitted by,



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